



## OSCILLOGRAPH RECORDING

Figure 2

The multi-channel oscillographs, continuously display on a screen, the plots of gage, profile, tangent crosslevel, curve Superelevation, degree of curvature, alignment, and location references. Representative lines drawn on the graph chart can infer statements of track quality. Copies of graphical displays are provided and clearly identify so that serious exceptions can receive immediate attention. Lines differentiating non-complying conditions mean operational and maintenance remedial action. Upon field (on-the-ground) verification by FRA, compliance responsibility resides with the track owner, who knows or has notice; the track does not comply with the federal requirements. The rack-mounted Astro-Med® chart (Figure 2) is an eight-channel chart recorder. The chart is loaded with z-fold thermal paper. One ream of paper will cover a

distance of approximately 267 miles. The sheets are numbered in the center of the paper in red, descending from 400 to 1. The first and third channels (top to bottom of the chart) are the Right and Left Profiles. Major divisions represent one inch, and the minor divisions are two-tenths of an inch. The full scale is plus or minus five inches, the centerline is zero. Channels two and four are Right and Left Alinement. Major divisions represent one inch, and the minor divisions are two-tenths of an inch. The full scale is plus or minus five inches, the centerline is zero.

The fifth channel is Crosslevel. Major divisions represent an inch and a quarter, and the minor divisions represent a quarter inch. The full scale is plus or minus six and-a-quarter inches. The centerline is equal to zero crosslevel or Superelevation. A line plotting to the left will indicate left rail is the high rail, and plotting to the right indicates right rail is the high rail, viewing the chart.

Channel six is the Curvature channel. This channel has three scales, which are five degrees, ten degrees, and twenty degrees of curvature. Correct selection of (5, 10, or 20) curvature is dependent upon the physical layout of the track. On a scale of five degrees, the major divisions are one degree, and the minor divisions are 12 minutes. A curvature scale of ten would be a factor of two, and a curvature scale of twenty would be a factor of four. The centerline of the Astro-Med<sup>®</sup> chart also represents tangent or zero degree curvature tracks. Plotting to the right of the centerline is a left-hand curve and plotting to the left of the centerline is a right-handed curve, as viewed in the direction of travel. Gage is the seventh recorded channel. It is set up with each major division equal to a quarter inch, and each minor division is equal to five hundredths of an inch. The centerline, of the gage channel, is 57 inches. The right border is equal to 55 <sup>3</sup>/<sub>4</sub> inch, and the far left margin, 58 <sup>1</sup>/<sub>4</sub> inches.

The eighth channel is the ALD channel. At each milepost marking, track number and current Class of Track tested are reported. This will assist in locating track exceptions. The curvature scaling with the file number (yymmddxx) is posted on the right border. Location references consist of event or message numbers that clearly indicate mileposts and other wayside features, such as road crossings, bridges, and trackside detection devices (e.g., hot boxes and clearance devices) are detected and manually entered in the data stream by the contractor. Other features maybe marked automatically on the chart when automated location detection (ALD) equipment senses their presence magnetically (i.e., turnouts and wayside detection devices), allowing inspectors and host railroad representatives to easily locate exceptions from the either analog or video chart references, at the time of occurrence.

TGMS program is a real-time, distance-based program that controls the acquisition of track measurement signals. It processes geometry parameters and makes a comparison of the display and reporting of the data, including chart recorder presentations, exception printouts, and conversion to a CD-ROM medium. RQMS is a ride quality program and DGPS is a program that processes longitude and latitude coordinates. Geometry data is sampled at one-foot intervals along the track and accurate (within the specified tolerances, as outlined in Table 3, page 18) for gage, alinement, and track surface.

TGMS and EDITOR programs allow the reproduction of previously collected data to generate analog charts and track safety standard Exception Reports. Either TGMS or RQMS programs can send a compressed copy of the exception report to the computer in the rear viewing area for review by railroad and FRA personnel. Data is stored on computer disk during the collection process. After completion of the survey, data stored on the computer disk is transferred and written on CD-ROM disk for archive and database purposes.